



Online Training Environments

Online Virtual Worlds as Learning Environments

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Abstract

Online and distance learning and education is becoming more and more attractive for many academic institutions. My intentions with this thesis project is to enhance online and distance learning through a more immersive and interactive fashion. While my initial objective was to deliver online learning through enhancing traditional web based applications using Web 2.0 technologies such as Facebook and MySpace, I have realized that the experience still will not be immersive enough. Hence, I have turned to virtual environments.

Virtual Worlds and Virtual Environments are ever more so popular. Today there are hundreds of virtual worlds available on the market. These are alternative worlds that are developed to supply online entertainment and social networking for users.

Second Life is one of the more popular virtual worlds with more than 9 million residents (as of August 2007). Second Life is a high resolution 3D virtual world where avatars are fully customizable. Land can be bought and owned; residents retain the right to any digital objects created. Objects such as buildings, vehicles, apparel, skins and furniture can be created, bought, sold, or traded. Second Life also has many communities and groups including businesses such as IBM, BMW, Microsoft, Mercedes Benz, Sony and also academic institutions such as Harvard, Princeton, Stanford and the like.

Virtual environments and virtual worlds are a great means of exploring the possibility of extending the classroom material into these environments and a chance of exploring possibly a new method of delivering effective ideas and examples to the students. Various examples can be included in a virtual environment including tutorials and online lectures.

Introduction

New technologies provide extraordinary and sometimes supernatural powers to those people who master them. Networked computers with advanced interfaces are compelling new technologies that are being rapidly disseminated. The opportunity for rule-breaking innovators and business-focused entrepreneurs are substantial, and the impact on individuals, organizations, and cultures are profound. Over the past few years there have been many academic and non-academic papers that have been published on the feasibility of online education. This paper will demonstrate the benefits of Virtual Learning through Virtual Environments and how it enhances the means of accessing educational resources online at anytime and from anywhere in the world in a more human-centric way compared to the traditional methods installed and practiced today.

Online classes became popular and started making their way into higher education by the late 1990's. I was attending Cal Poly Pomona as an undergraduate student in Computer Science when I heard about classes available online for meeting elective requirements. At first these online classes didn't make sense to me, after all, how can one take classes online? Classes such as Data Structures, Algorithms, Artificial Intelligence, Numerical Methods just to name a few from the computer science curriculum, and of course there were mathematics and physics. But over time as the technology and the understanding of how to best utilize current technology for online classes have enabled institutions to offer even classes in the technical fields such as Computer Science and Engineering. And today this is even more evident than ever before.

There is no doubt that online and distance learning and education is becoming more and more attractive for many academic institutions and organization for several reasons[4,6]: to name a few, cost, outreach, time and location.

Introduction (continued)

By now, most students, instructors and institutions have heard about the wonderful phenomenon known as Second Life in one form or another. Albeit, most people still look at Second Life as a gaming environment, one should not jump that conclusion too fast. Institutions such as California Lutheran University and organizations alike have to be careful not to miss the opportunity of using the environment as an educational and communication tool.

For the purpose of this report, Linden Lab's Second Life virtual environment has been selected for the design and implementation of our project due to the maturity level of the technology. Linden Labs has created a platform where a user is given the power to create its content, much like the internet has been developed as a protocol and each individual using the appropriate tools can develop simple to complex web sites or web applications.

Linden Labs has created the basic foundations of Second Life to support a multi-user environment where individuals can gather and socialize regarding topics of interest. The basic means of communication are already provided which make it ideal for institutions and instructors to quickly design and develop online courses that are more immersive and educational for their classrooms.

So what is Second Life? Second Life is one of the more popular virtual worlds with more than 9 million residents (as of August 2007) and still growing. Second Life is a high resolution 3D virtual world where users login through free or premium paying accounts, create their avatars, which are fully customizable, and proceed to interact with other users across the world. The main reason Second Life should not be confused as a game is due to the fact that Second Life as is does not have any objectives! The users create their own virtual environment and their own objectives through the tools which are provided by Linden Lab for builders and developers to create their own immersive worlds to the extent of their imagination.

There are several things that need to be considered for the planning, designing and implementation of a virtual environment. The following is a list of the basics:

Location, Space Requirements, Support Time, Faculty Involvement, In-World Events and Features, Initial Endeavors, Emerging Educational Uses, User Training.

The Design

The main campus was set to be built on a 8,192 square meter lot with a prim limit of 1,875. The size and more importantly the number of primitives allowed for the region was sufficient for my project. Having said that, at a point within the development of the environment I did reach the limit of primitives which forced me to change some of the design aspects of the environment. This is specifically true if you want to make more complex and elegant objects within the virtual environment. In other words, for a professional project, you will be better off to invest the money and get a private island for not only maximum primitives, but also full control over the environment.

The approach was to create an open space outdoor environment for students to be able to gather and hang around, and several structures which will hold the learning material in different formats. Another idea was the creation of a large model showing the internals of a computer and also the internals of a Central Processing Unit.



Results

Over the last decade there have been three primary learning modalities used for student or employee development: (1) live instructor led, synchronous settings like a classroom or conference room, (2) electronic, synchronous learning through audio or web conference systems, and (3) electronic, asynchronous, self-paced learning also called e-learning.

Let's take a look at some of the advantages that virtual world learning provides relative to these modalities:

Practice Until Perfect: Virtual worlds enable new learners to practice and role play their new-found skills in a safe medium, often in the presence of mentors or instructors, before they apply their skills in the real world. These learners can now "fail safely" and without having to travel to participate.

Add Gaming or Problem Solving: Virtual worlds can provide structured and challenging game play for individuals or teams to assess how well they adapt to new challenges or work together as a team towards a goal. The use of dynamic problem solving in realistic 3D environments recreates real-world situations for business learners.

Blend Learning with Social Context: Many researchers and analysts indicate that the majority of knowledge accumulated by individuals comes from informal discussion with peers and colleagues, nor from courses. Virtual worlds can easily mix and match both formal courseware, with lighter weight documents in whatever mix is appropriate for someone's curriculum.

The Fun Aspect: 3D applications are more engaging, immersive, memorable, and fun than web conferencing and most e-learning content. It's no accident why the most popular games in the world are based on 3D and virtual world technologies.

The New Generation: Younger students and workers entering the workforce are very fluent with computer games and social networking software since they grew up using these tools.

Virtual World Challenges

Deploying virtual worlds in a large scale for an organization has been a challenge for a variety of IT, management and line-of-business perspectives. Before we delve into the more complex aspects of these challenges, let's take a look at the basic fundamental needs.

System Requirements

Since virtual worlds are based on advanced 3D computer graphics, the host computers which will be used to run the client needs to meet a minimum hardware specification threshold.

Security

I would say that one of the main drawbacks that holds back virtual world deployment in any organization and educational institutions is that of security. The question of how individuals will be represented, their identity not be compromised, and their safety in the virtual world is a bigger challenge then that of any hardware or software issues.

Intellectual property

Intellectual property (IP) is a very sensitive and important topic within virtual worlds. Many organizations and institutions are worried about the safety and security of their intellectual property. Even though in 2003, Linden Labs announced that it granted users the right to own the IP of their own creations in Second Life it is still a touchy subject in the enterprise world.

User Acceptance

User acceptance is one of the very critical components of any large enterprise application roll outs. No matter how good an application is designed and implemented, if the user community is not eager to use the application, it is of no use. Same thing goes with Virtual Worlds.



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Results (continued)

Empirical Results

It was shown that 90% of the respondents have less than a year experience on Second Life. 70% access Second Life from home. 70% perceive Second Life to improve collaboration, 69% to improve communication, and 61% to improve cooperation between people. 56% of respondents perceive Second Life to be easy to use, and finally people are using Second Life not to change their identity, but rather to explore and visit new places and meet people.

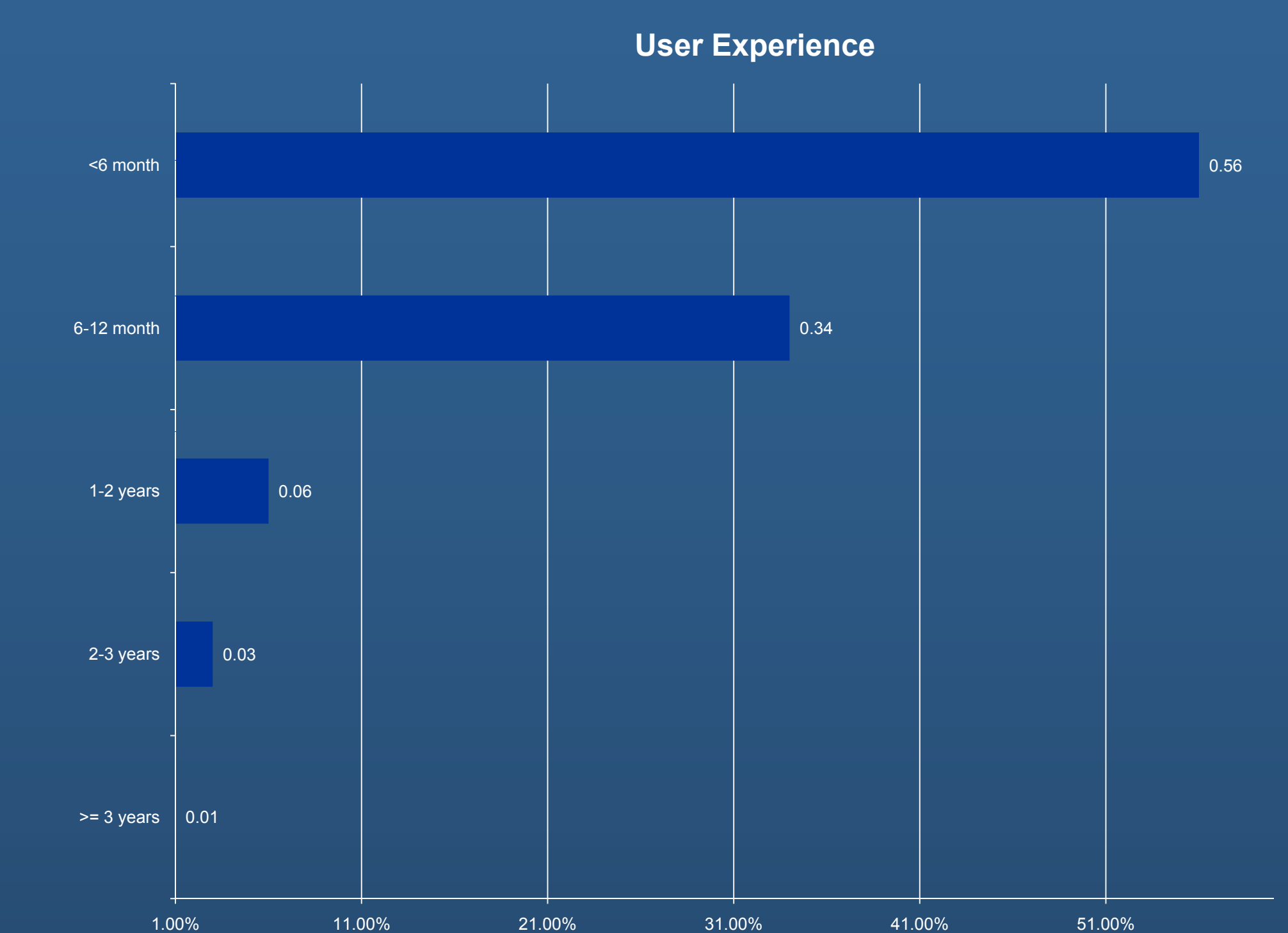


Figure 1. User time on Second Life.

Discussion

The cognitive domain exists in the human mind and involves information processing. As an example, strategic communication – the capability to inform and appropriately influence audience perceptions, decisions, and behavior – focuses on the cognitive domain. Influencing the will of an adversary requires highly skilled and creative thinking, coupled with synthesis and application of information in a timely manner.

The pace of technological improvements will continue to accelerate. Exponential change will be the norm. Increases in computing power (quantum computers), graphics, and bandwidth will lead to advancements in visualization, modeling, simulation, and animation that are unimaginable today. Modeling and simulation is a key area where operations and training will need to be more closely integrated in the future. The need to update personal knowledge will be continuous and accelerating and increasingly dependent on technology.

As indicated, the virtual campus that was designed and developed for this project is more of an exploration and the possibilities of the environment in the computer science curriculum. This project was mostly concentrated on the overall process of planning and staging a virtual environment that can be used with the current course work at California Lutheran University.

I encourage the computer science department as well as the university itself, to put together a real world plan to establish a presence within the virtual world of Second Life. This will help not only the image of the university, but also it will enable the university to have another channel to outreach and acquire potential new students within its body.

For more information on the topic visit: <http://www.karamian.com>

Direct Link To Report: <http://www.karamian.com/ComputerScience/MSCSThesisWork.aspx>